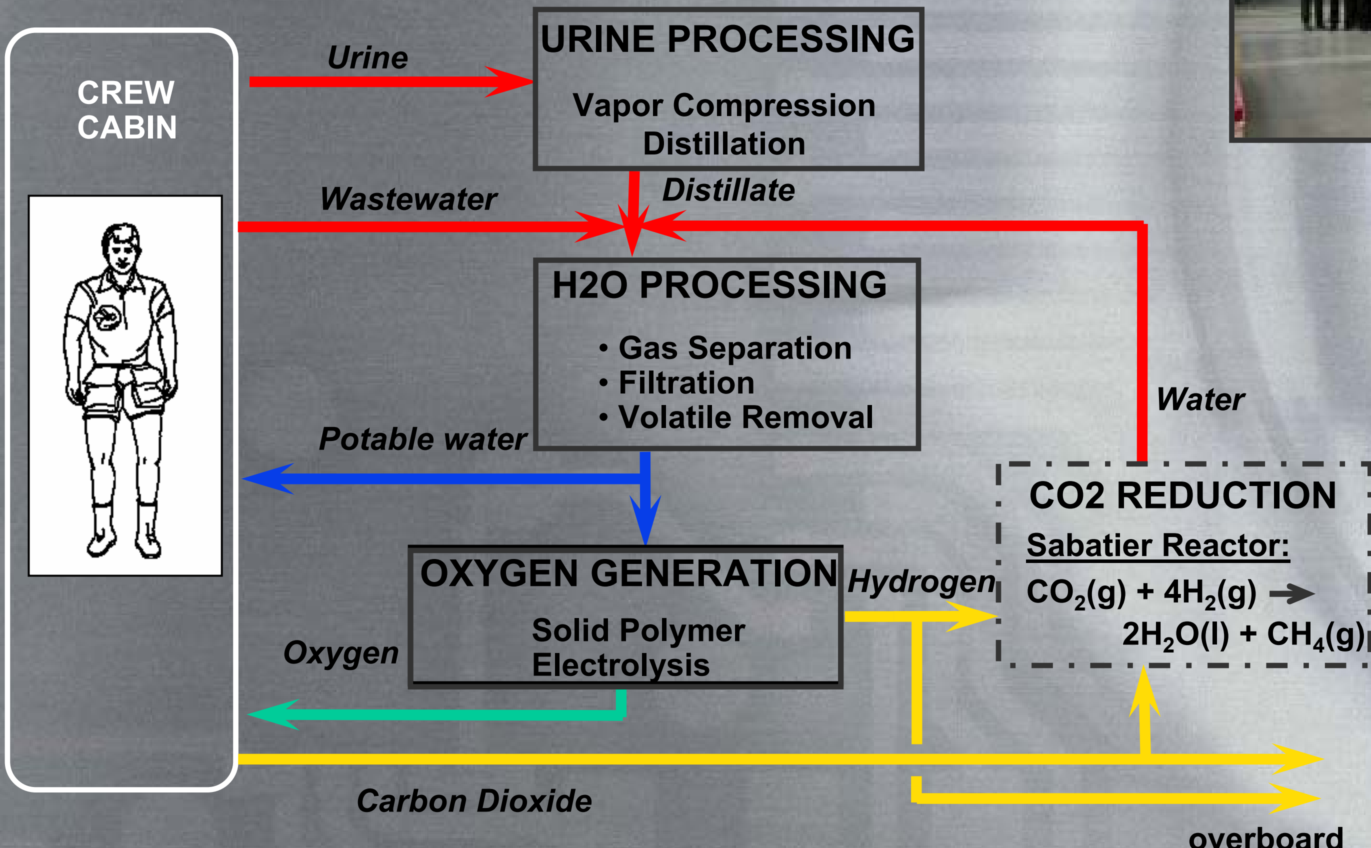
Life Support Today

Provided by Service Module

Life Support in the Future

Node 3 provided by ESA at Alenia in Italy

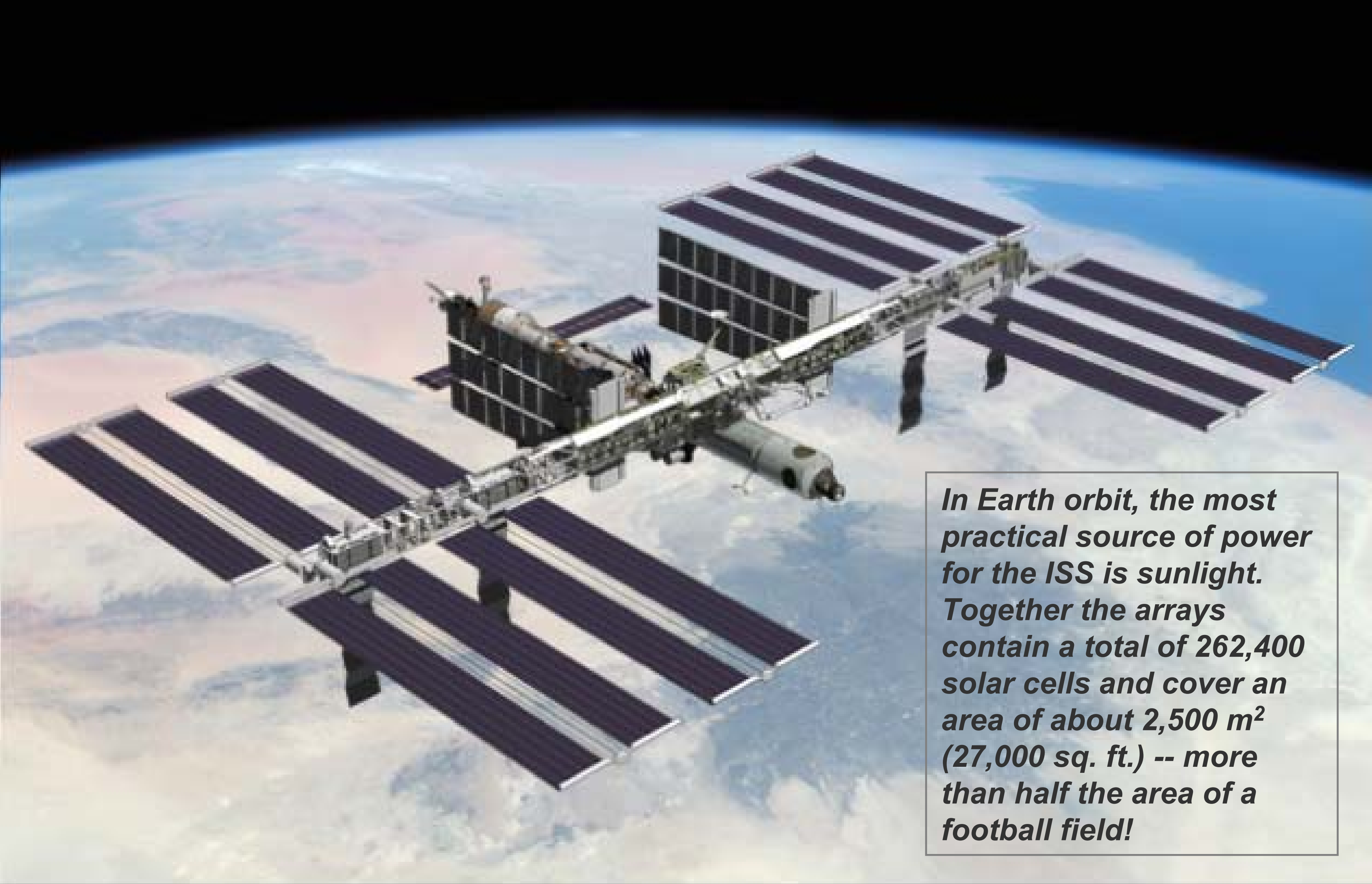
U.S. Environmental Control and Life Support System



Electrical Power Subsystem Today

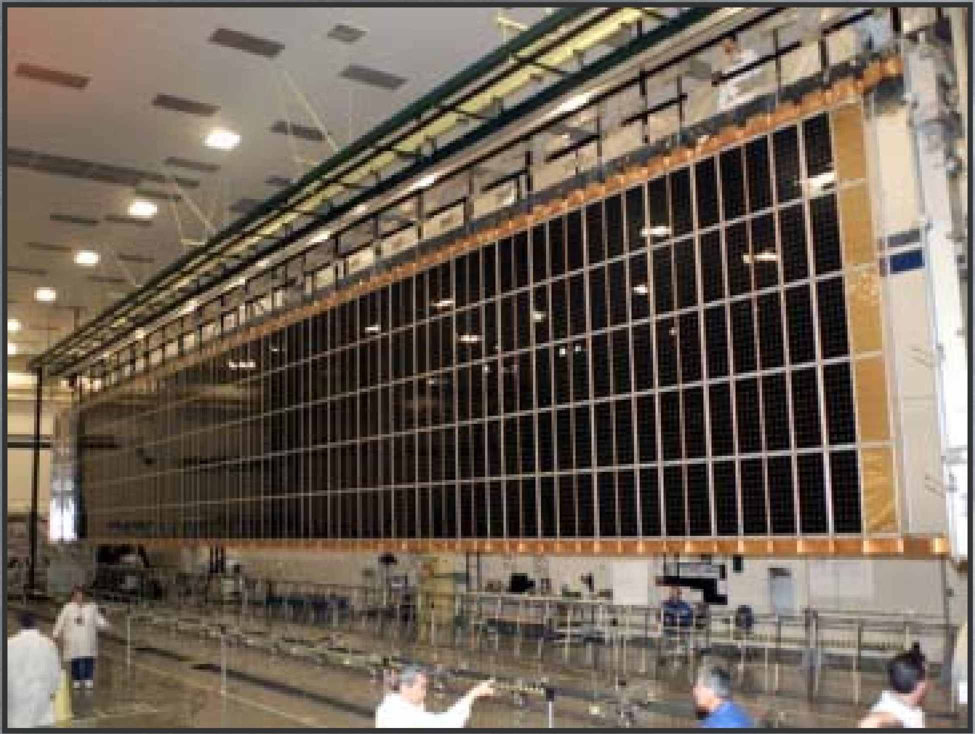
During the shadow phase the Space Station relies on banks of nickel-hydrogen rechargeable batteries to provide a continuous power source

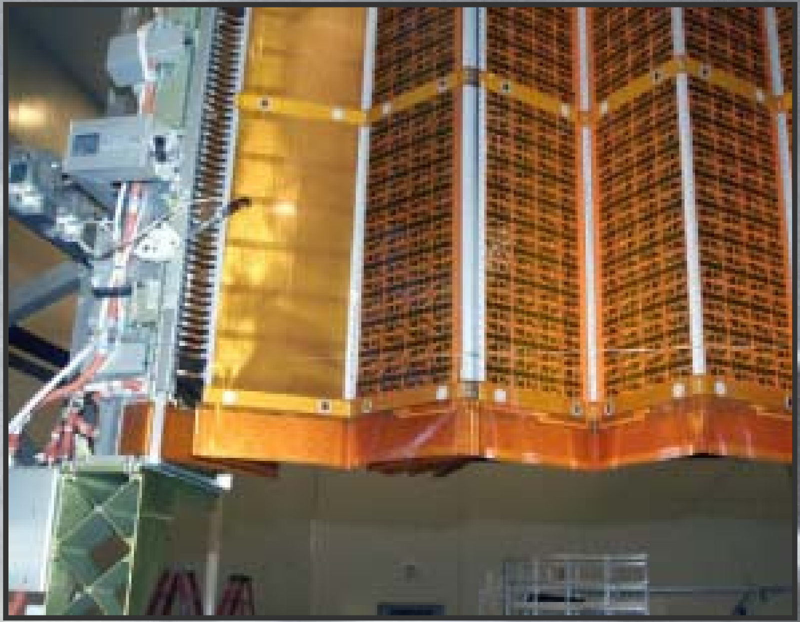
Electrical Power Subsystem of the future



In Earth orbit, the most practical source of power for the ISS is sunlight. Together the arrays contain a total of 262,400 solar cells and cover an area of about 2,500 m^2 (27,000 sq. ft.) -- more than half the area of a football field!

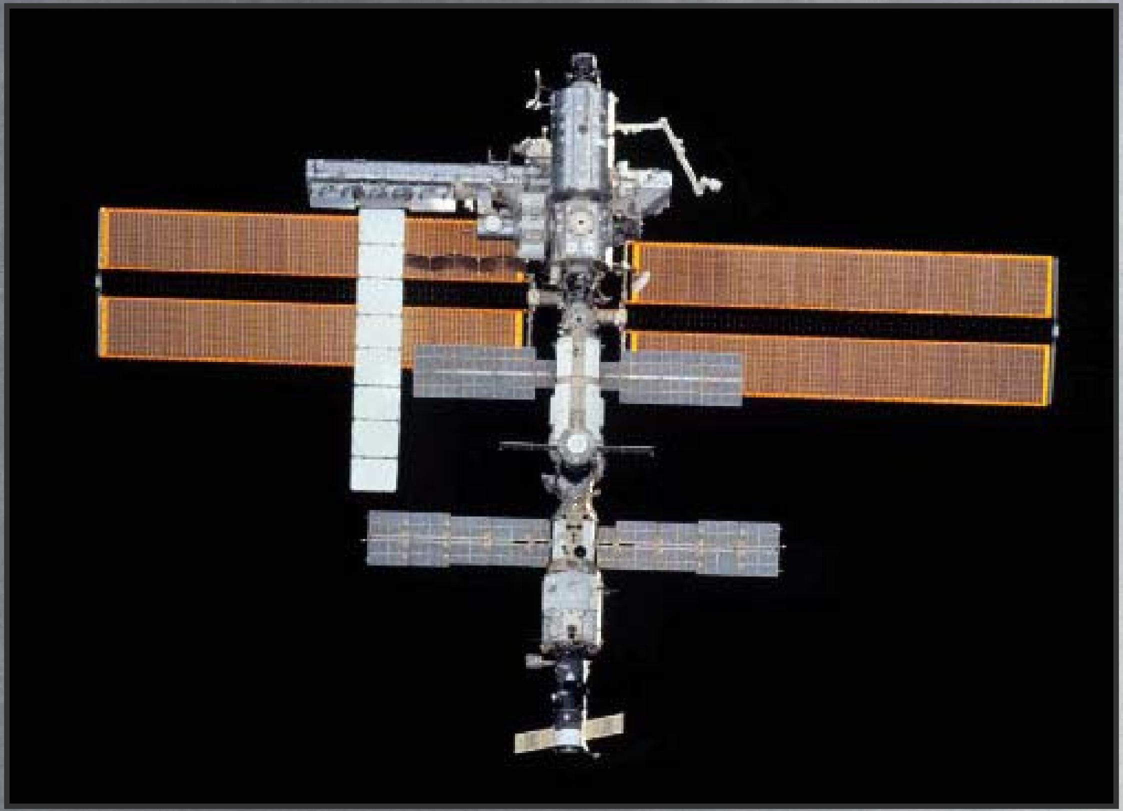
Electrical Power Subsystem of the future



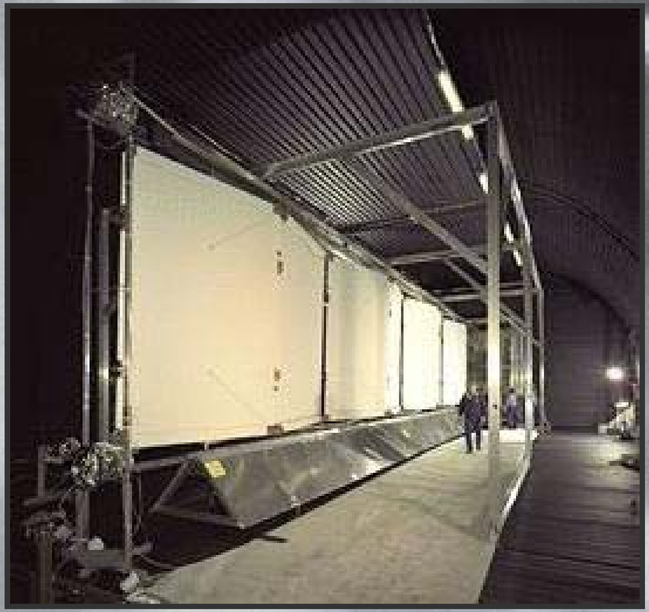


4 U.S. Solar Arrays will provide 110 kW of power for life support, battery charging, and other power management use. 46 kW of continuous electric power are left over for research work and science experiments.

Thermal Control Subsystem



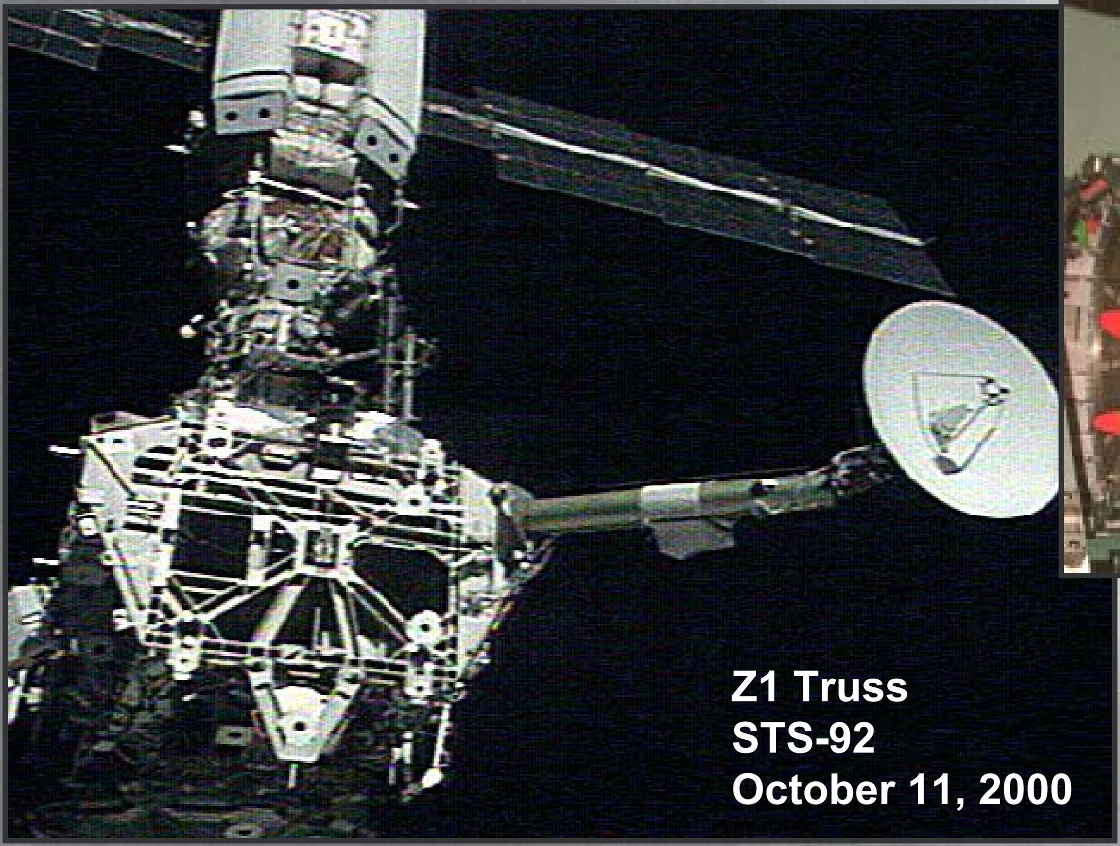
The Station's outstretched radiators are made of honey-comb aluminum panels. There are 14 panels, each measuring 6 by 10 feet for a total of 1680 square feet of ammonia-tubing-filled heat exchange area.



The Radiator system was tested at NASA Glenn Space Power Test Facility.

Guidance, Navigation, Control, and Propulsion

Electrical propulsion provided by U.S. Control Moment Gyros. Service Module jets also use fuel brought by Progress to boost station. Shuttle also boosts station.

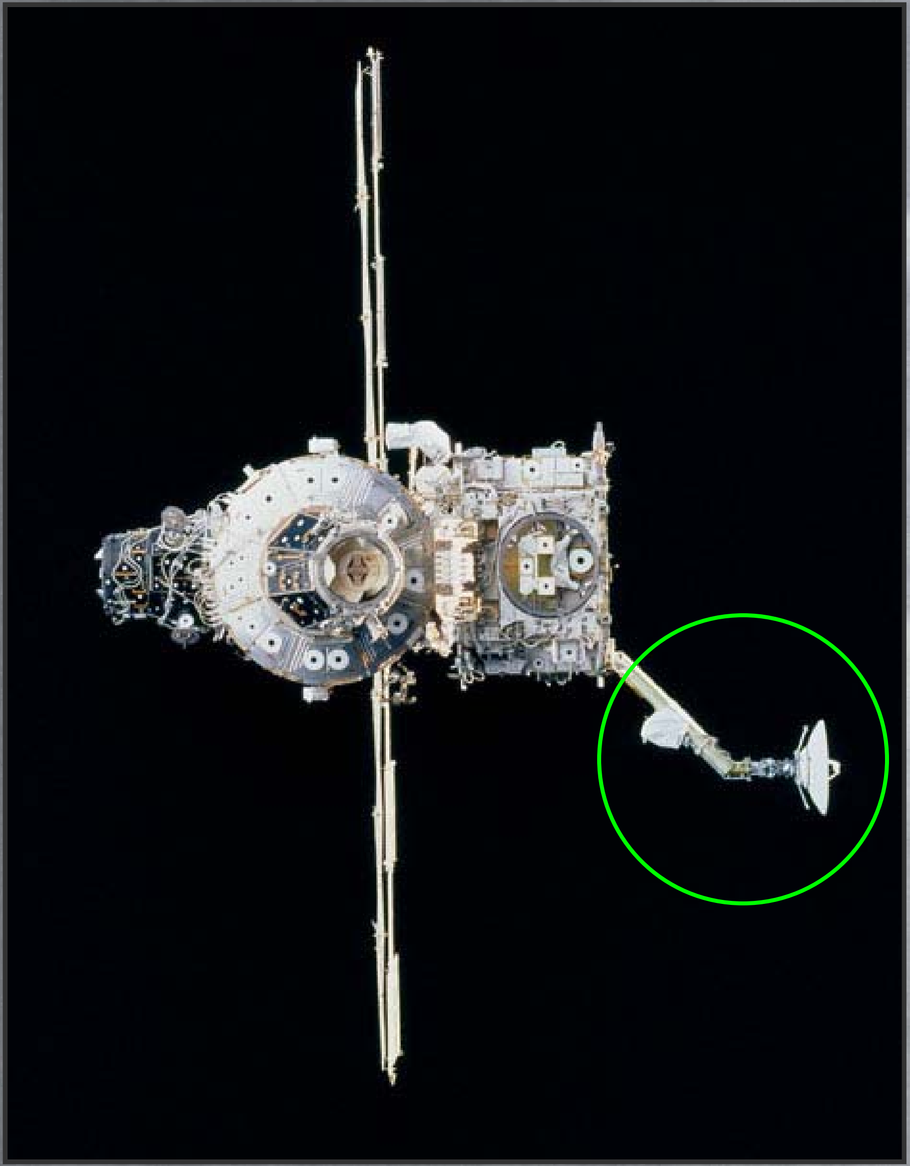


Z1 Truss
STS-92
October 11, 2000

Guidance, Navigation, Control, and Propulsion

Engineering challenges for long duration space flight: for example, changing out the Control Moment Gyro.

Communication and Tracking



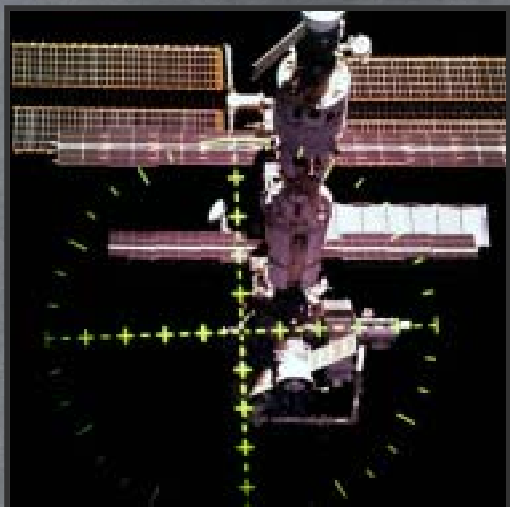
The station has S band and KU Band communications systems. Ham radio is also used.

Command Data and Handling

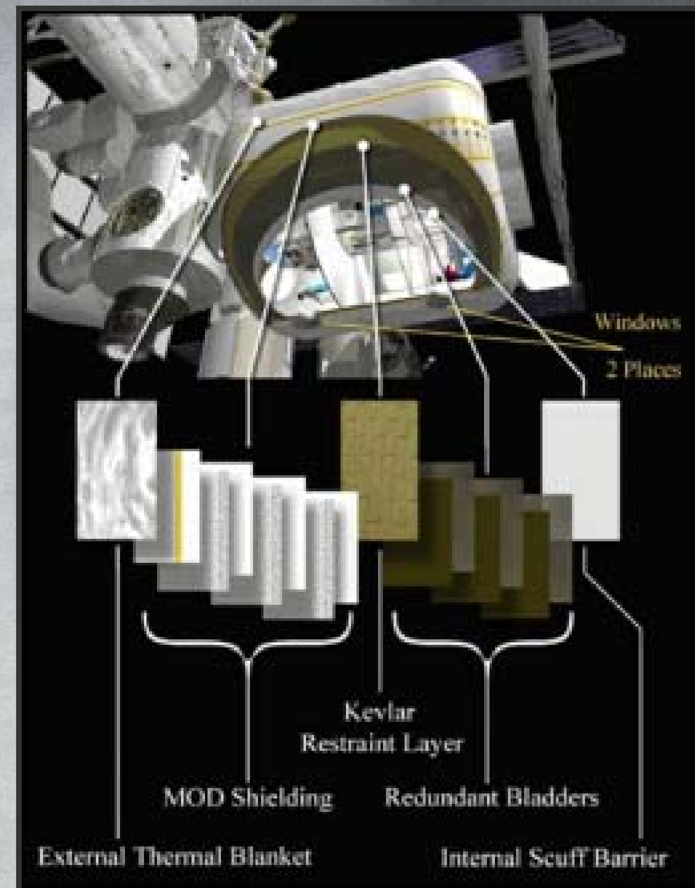
Currently, 2.8 million lines of software code run through the stations on-board laptops and main computers keeping all major systems functioning and elements integrated.

The software demand will double in the future.

Structure and Mechanisms



The US-designed Common Berthing Mechanism (or CBM) links together the modules. To ensure a good seal, the CBM has an automatic latching mechanism that pulls the two modules together and tightens 16 connecting bolts with a force of 19,000 pounds each!

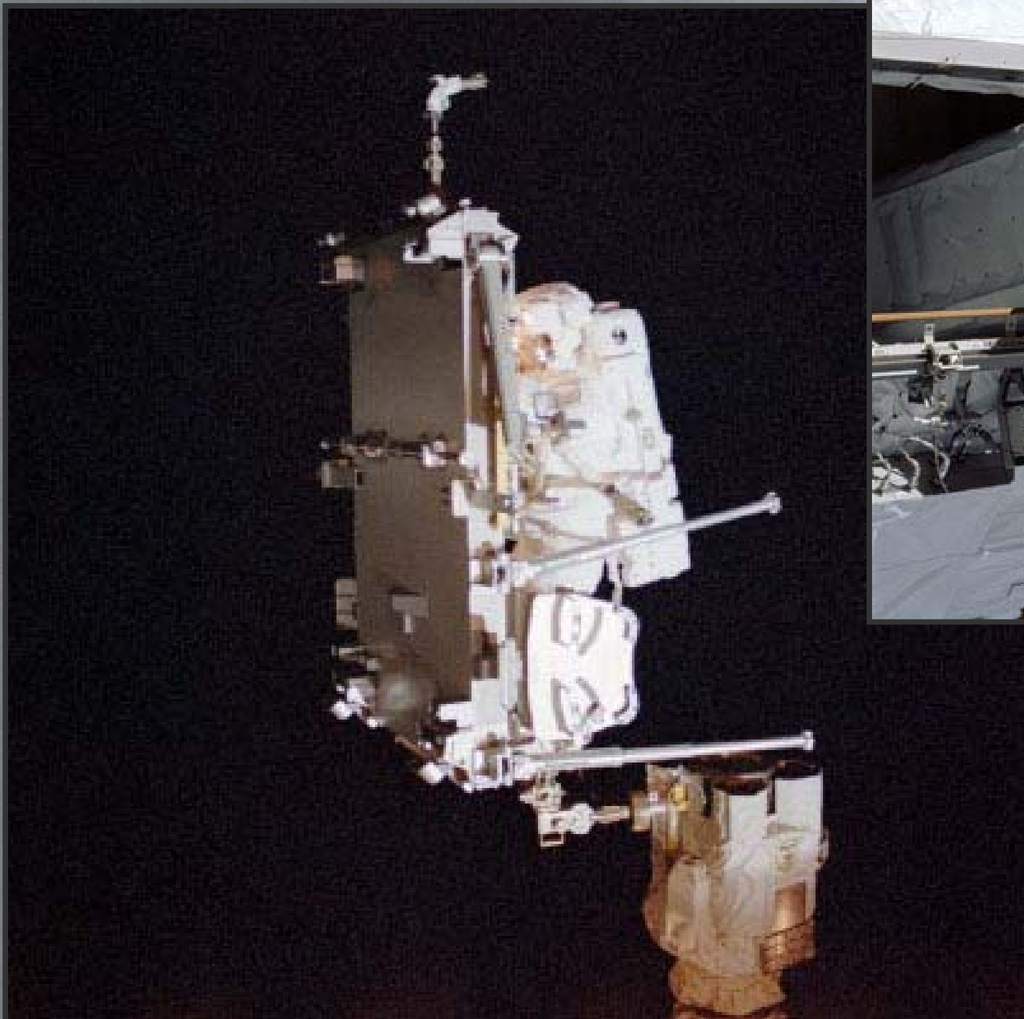


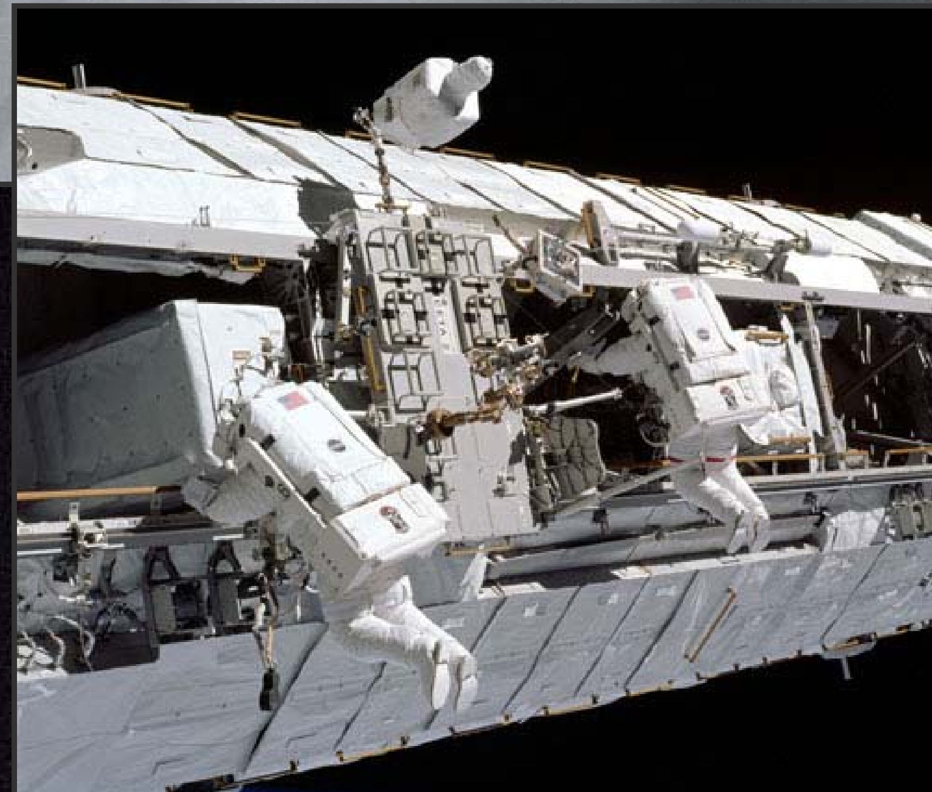
Layers of Kevlar and other impact-resistant materials reduce the chance that small debris could penetrate the modules' walls and endanger the crew.

Robotics

Canadarm2 represents next-generation robotics. By flipping end-over-end between anchor points it can move around the ISS like an inchworm. With its seven joints, CanadArm2 is more maneuverable than its predecessor on the shuttle and even more agile than a human arm.

Robotics

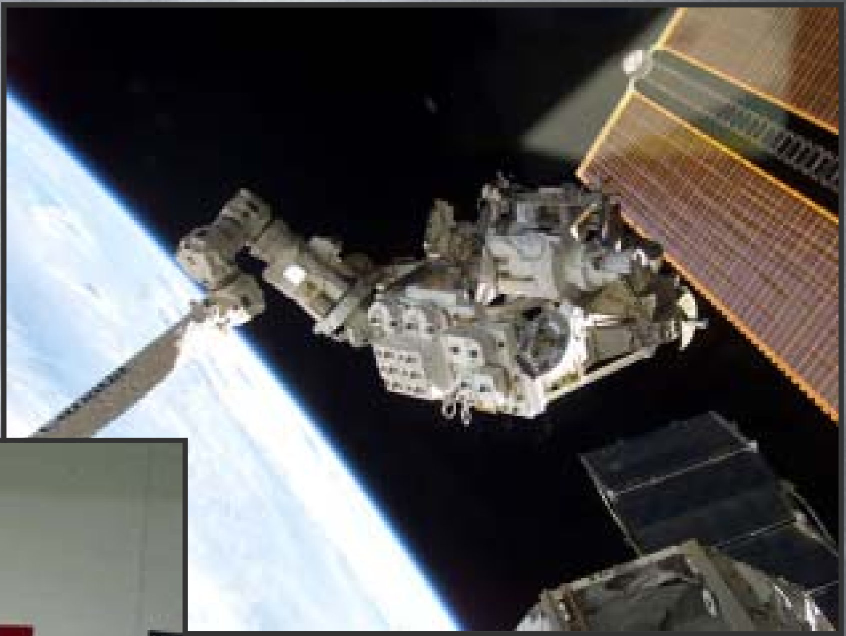


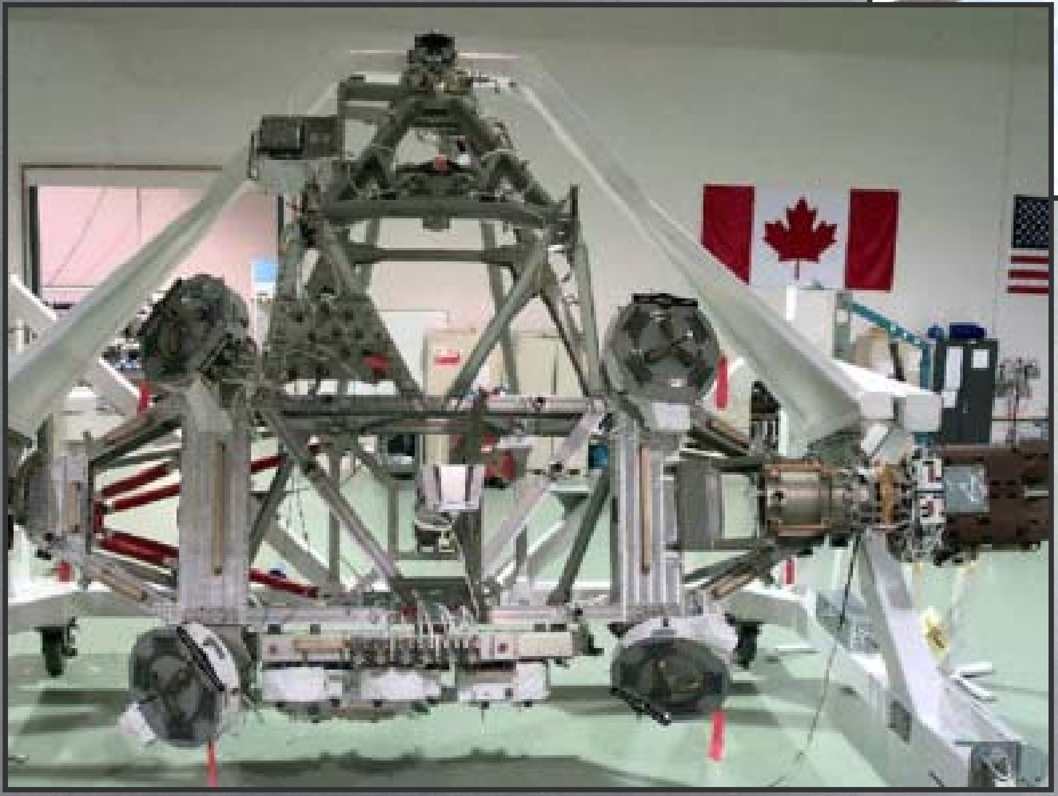


Crew Equipment and Translation Aid Cart (CETA)

Robotics

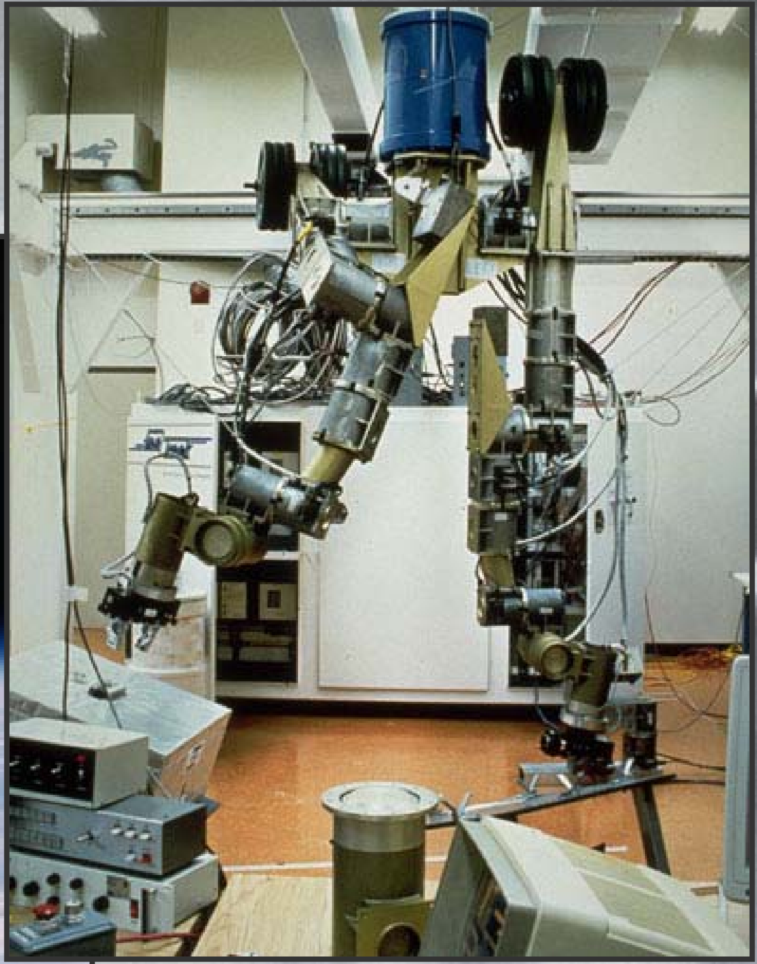
Mobile Base System





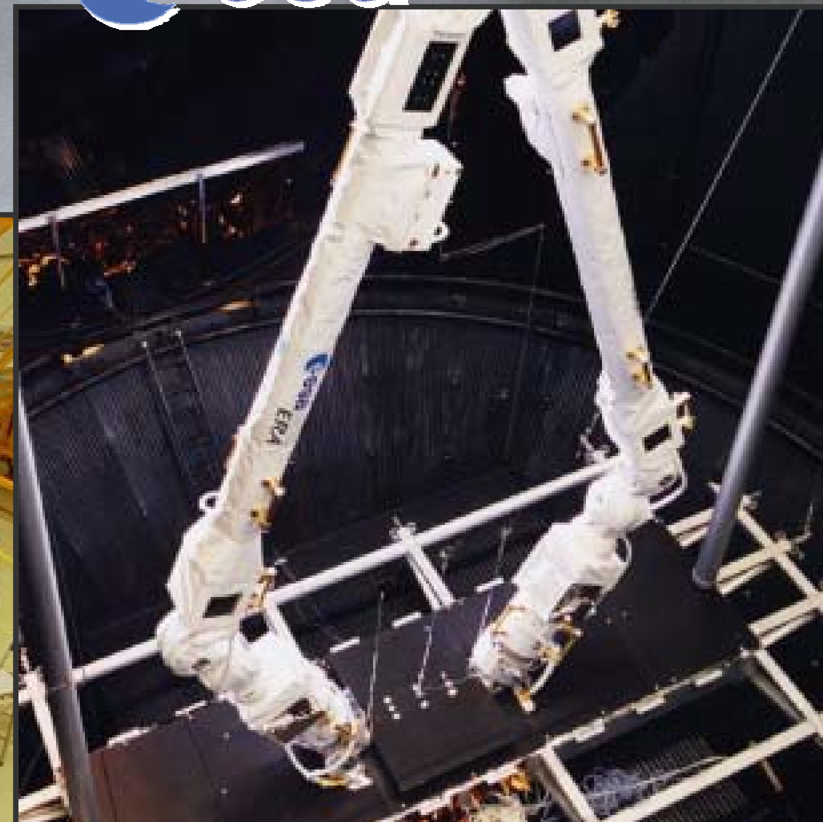
Robotics of the Future

Special Purpose Dexterous Manipulator

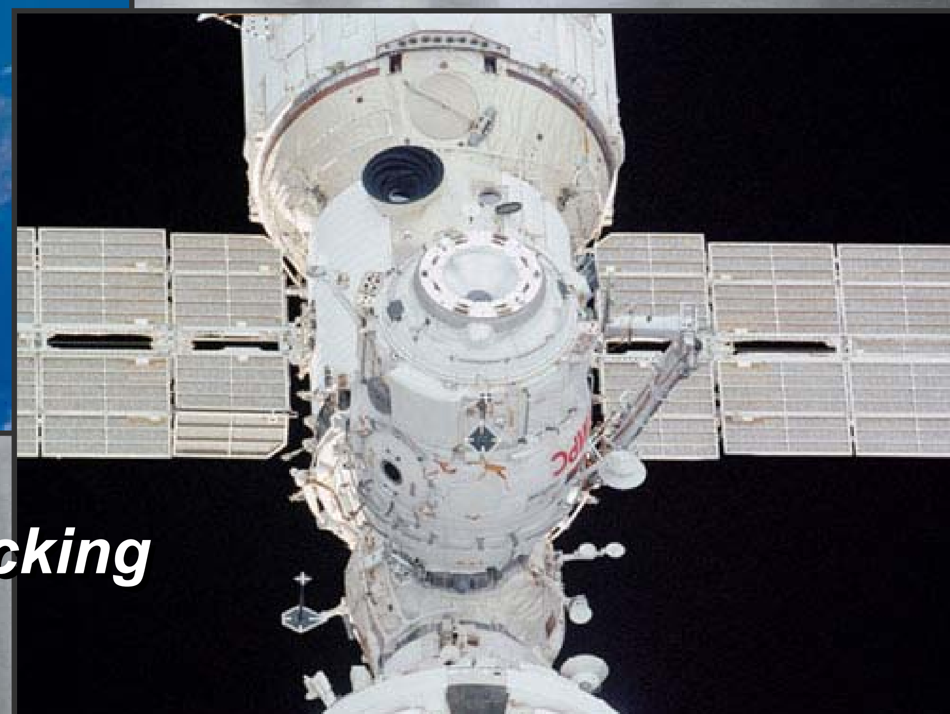


CSA ASC

Robotics of the Future



A U.S. and Russian Door to Space



Russian “Pirs” Docking Compartment

Extravehicular and Crew Subsystems

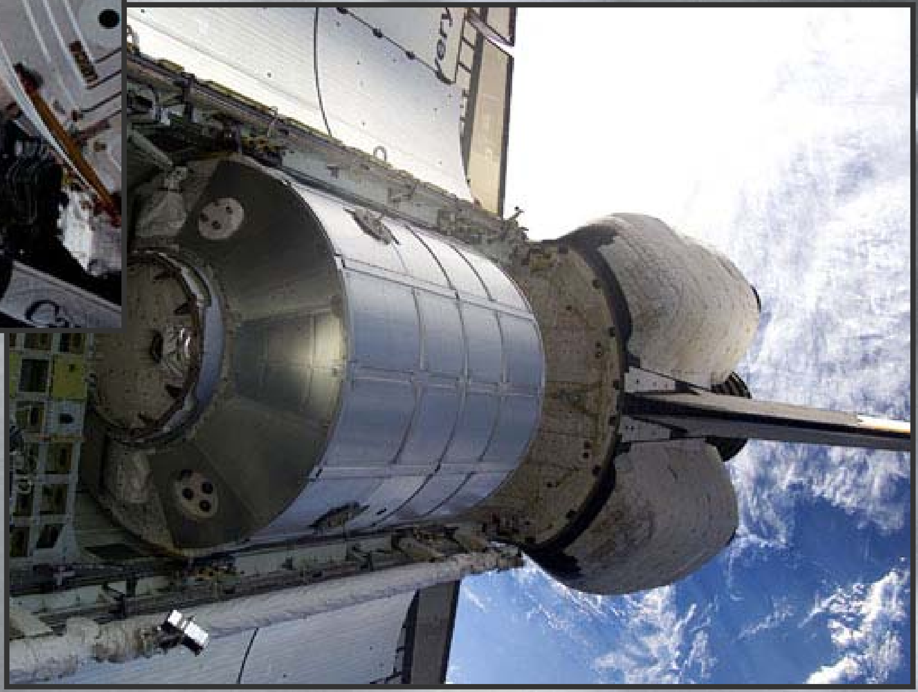
Human and Robotic Integration

The ISS is advancing human and robotic space operations to new heights.

To date astronauts have logged more than 300 hours of space walking activity, experimenting with tools and equipment.

Logistics and Re-supply Today

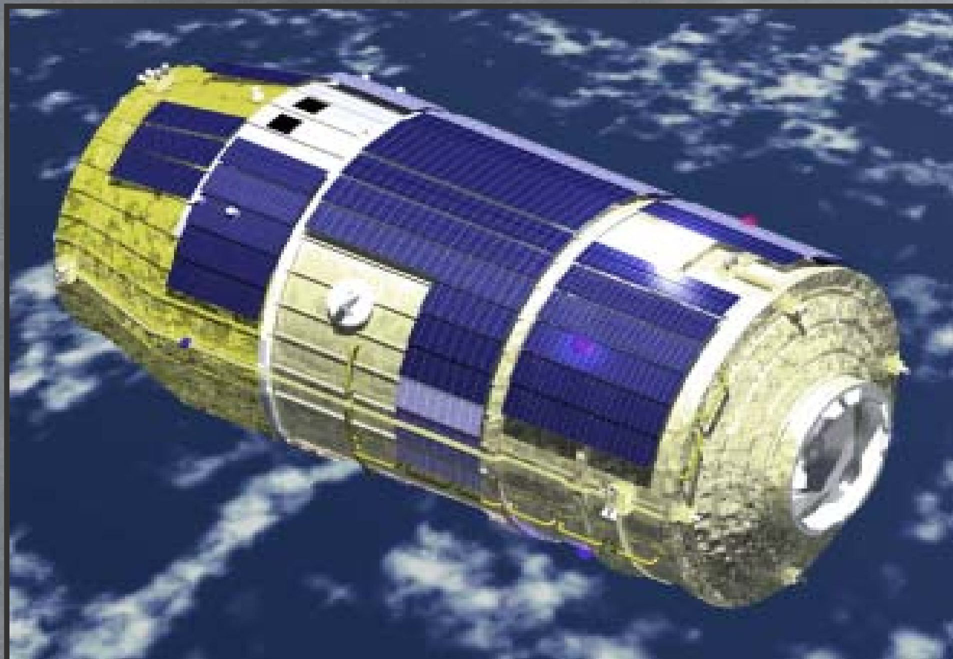
A fleet of three Multi-Purpose Logistics Modules (MPLMs), built by ASI for NASA, bring tons of equipment and supplies to the station.



Logistics and Re-supply Today

Russian Progress re-fuel and re-supply ships bring propellant to assist keeping Station in orbit, and dry cargo.

Logistics and Re-supply in the Future



Japan is building the HII Launcher Transfer Vehicle, (HTV) that can perform additional logistics and re-supply functions in the future.

JAXA

Logistics and Re-supply in the Future

Europe is also building an Automated Transfer Vehicle (ATV), scheduled for first launch in 2005.